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Original article

Physical therapy after prophylactic mastectomy with breast reconstruction: A prospective randomized study

Dmytro Unukovych [a,*], Hemming Johansson [a], Elizabeth Johansson [c], Brita Arver [a,b], Annelie Liljegren [a,b], Yvonne Brandberg [a]

[a] Department of Oncology-Pathology, Karolinska Institutet, SE-17176 Stockholm, Sweden
[b] Department of Oncology, Radiumhemmet, Karolinska University Hospital, SE-17176 Stockholm, Sweden
[c] The Swedish Cancer Society, Cancerfonden, David Bagares Gata 5, 10155 Stockholm, Sweden

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ABSTRACT

Introduction: The rate of prophylactic mastectomies (PM) is increasing. Patients generally report high levels of health related quality of life and satisfaction after the procedure, whereas body image perception and sexuality may be negatively affected.
The aim of the study was to evaluate the interest in physical therapy as a means of improving body image and sexuality in women after PM.
Patients and methods: Patients undergoing PM at Karolinska University Hospital between 2006 and 2010 were eligible. The following patient-reported outcome measures were used at study baseline and 2 years postoperatively: the body image scale (BIS), the sexual activity questionnaire (SAQ), the short-form health survey (SF-36), the hospital anxiety and depression scale (HAD), and a study specific "pain/motion/sensation scale".
Results: Out of 125 patients invited to participate in this prospective randomized study, 43 (34%) consented and were randomized into the intervention ($n = 24$, 56%) or control ($n = 19$, 44%) groups. There were no statistically significant between-group differences found with respect to BIS, SAQ, SF-36, HAD, and "pain/motion/sensation". Two years postoperatively, more than half of the patients in both groups reported problems like feeling less attractive, less sexually attractive, their body feeling less whole, and being dissatisfied with their body. A majority marked a decreased sensation in breast area.
Conclusion: The interest in a physiotherapy intervention was limited among women who had undergone PM. The intervention did not show any substantial effects. A large proportion of patients reported specific body image related and pain/motion/sensation problems postoperatively.

1. Introduction

An increasing public awareness of hereditary breast cancer, development of risk assessment tools and availability of genetic testing contribute to the growing demand for prophylactic surgery today [1,2]. The rate of prophylactic mastectomies (PM) is increasing [3]. Typical candidates for this procedure are relatively young women with a family history of breast cancer and/or carriers of BRCA 1/2 mutations, though some other recommendations for PM have also been specified [4]. The majority of the women ask for breast reconstruction in conjunction with risk-reducing surgery, be it bilateral prophylactic mastectomy (BPM) or contralateral (CPM).

From the patient's perspective, the process of breast reconstruction might be a lengthy period after the operation with the need of a number of follow-up visits and sometimes reoperations. As a result, young and active patients may find it difficult to return to regular daily life activities in terms of role limitations due to physical and emotional problems [5–7]. We have previously shown that patients after PM with reconstruction generally reported high levels of health related quality of life (HRQoL) and satisfaction with the cosmetic results [5,8,9]. In accordance with international studies, however, we have found that the procedure could negatively affect body image perception and sexuality [10–12]. These consequences seem to be long-standing and there is a need for interventions to prevent and treat the problems perceived by the patients after PM. Physical therapy has been

* Corresponding author. Tel.: +46 761482998; fax: +46 8331587.
E-mail address: dmytro.unukovych@ki.se (D. Unukovych).

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suggested to decrease problems after breast surgery [13]. With the current study we hypothesized that physical therapy may improve body image and sexuality. Thus, the aim of the study was to evaluate the interest in physical therapy as a means of improving body image and sexuality in women after PM. The effects of physical therapy on pain, motion, sensation, anxiety, depressive symptoms and HRQoL were also studied. A third aim was to compare study participants and non-participants with respect to the above-mentioned patient-reported outcomes (PROs).

2. Patients and methods

2.1. Procedure

During 2006–2010, 138 patients underwent either bilateral ($n = 73$) or contralateral ($n = 65$) risk-reducing mastectomy at the Karolinska University Hospital. In conjunction with an ongoing HRQoL-study described elsewhere, all consecutive women scheduled for prophylactic mastectomy received a study questionnaire preoperatively, as well as 6 months, 1 year and 2 years after the date of PM [6]. Six months postoperatively, together with the questionnaire, the women received information about the physical therapy study and an invitation to participate. They were asked to respond on a separate sheet whether they would like to participate in the study or not. This sheet was to be sent to the researcher (YB) in a prepaid return envelope together with the questionnaire. The invitations were sent to 125 women. The remaining 13 women were not considered as appropriate candidates for the study as they lived geographically too far. Patients who consented to participate in the study were randomized into two groups: intervention (physical therapy) and control. For the randomization, blocks of 10 with stratification for the prophylactic mastectomy type (bilateral and contralateral) were used.

2.2. The intervention

A registered physical therapist (EJ) phoned the patients and booked a time for the first of six sessions. The intervention consisted of weekly sessions with a follow-up phone call after three months, and home physical exercises to be performed between the sessions. The first introductory session was 90 min and the following sessions about 45–60 min. The physical therapist examined the patient regarding body posture and upper body movements providing general information about the physical therapy course. The treatment was individually tailored, aiming to improve the operated area, to get the women used to the body changes, to help them touch and look at the operated area, to decrease possible muscle tension, and to avoid a skewed body posture. At each session, the physical therapist performed a light massage for about 25 min over the neck and shoulder area, front side and back side of the chest.

Detailed instructions about exercises for the chest wall and shoulders were given and recommended to be performed twice a day. At the following sessions, the home exercises were demonstrated by the patient and corrected by the physical therapist.

2.3. Instruments

The body image scale (BIS) is a 10-item scale evaluating the impact of surgical procedure on patients' self-consciousness, physical and sexual attractiveness, femininity, satisfaction with body and scars, body integrity, and avoidance behavior [14]. Each item is scored from 0 (not at all) to 3 (very much) and the sum of the BIS-items gives an overall score (range 0–30).

Table 1
Demographic and clinical data for all patients undergoing risk-reducing mastectomy during the study period.

Characteristics	Participants $n = 43$		Non-participants
	Control group	Intervention group	$n = 82$ (%)
	$n = 19$ (%)	$n = 24$ (%)	
Age at surgery, years			
Median [min–max]	42 [30–61]	43 [28–64]	43 [23–66]
≤35	3 (15.8)	6 (25.0)	14 (17.1)
35–45	8 (42.1)	8 (33.3)	36 (43.9)
45–55	5 (26.3)	5 (20.8)	17 (20.7)
≥55	3 (15.8)	5 (20.8)	15 (18.3)
Type of prophylactic mastectomy			
Bilateral	11 (57.9)	14 (58.3)	41 (50.0)
Contralateral	8 (42.1)	10 (41.7)	41 (50.0)
Calendar year surgery			
2006	7 (36.8)	6 (25.0)	14 (17.1)
2007	3 (15.7)	4 (16.7)	16 (19.5)
2008	4 (21.1)	4 (16.7)	12 (14.6)
2009	4 (21.1)	8 (33.3)	19 (23.2)
2010	1 (5.3)	2 (8.3)	21 (25.6)

The sexual activity questionnaire (SAQ) measures sexual functioning [15]. It includes 10 items divided into three sections: pleasure (desire, enjoyment and satisfaction), discomfort (dryness, pain), and habit (sexual behavior). The pleasure section includes 6 items (scores: from 0 to 18), the discomfort section- two items (scores: from 0 to 6), and the habit section- one item (scores: from 0 to 3). The sum of all items within each section produces the three overall scores.

The short-form health survey (SF-36) is a self-administered HRQoL-questionnaire evaluating general health status and generic health concepts not specific to age, disease or treatment group [16]. In this study, we also used SF-36 normative data, *i.e.* country-specific data for healthy women [17].

The hospital anxiety and depression scale (HAD) contains 7 items assessing anxiety and 7 items assessing depressive symptoms [18]. Scores range from 0 to 3 for each question, giving the summated score for each scale the range from 0 to 21. Cut-off levels for clinical levels of anxiety and depression have been specified: the

Table 2
Postoperative levels for BIS, SAQ, HAD, pain/movement/sensation scales and difference among study participants according to randomization.

Questionnaire & scale	Mean (SD)		Difference (99% CI)	*p*-Value
	Control group	Intervention group		
	$n = 10–12$	$n = 12–20$		
BIS				
Summated score[a]	7.2 (5.7)	8.2 (8.4)	−1.0 (−8.6 to 6.5)	0.71
SAQ				
Pleasure[b]	10.3 (4.3)	9.9 (5.3)	0.4 (−4.7 to 5.6)	0.81
Discomfort[c]	0.9 (1.3)	1.6 (2.1)	−0.7 (−2.6 to 1.2)	0.33
Habit[d]	1.1 (0.9)	0.7 (0.8)	0.4 (−0.5 to 1.3)	0.29
HAD				
Anxiety[e]	5.2 (3.6)	5.6 (4.8)	−0.5 (−4.9 to 4.0)	0.77
Depression[e]	3.5 (2.9)	2.5 (2.8)	0.9 (−2.0 to 3.8)	0.38
Pain/motion/sensation				
Summated score[f]	7.2 (4.3)	7.7 (5.4)	−0.5 (−6.1 to 5.1)	0.80

BIS Body image scale, *SAQ* Sexual activity questionnaire, *HAD* Hospital anxiety and depression scale, *SD* standard deviation, *CI* confidence interval.
[a] Higher score indicates more problems (range 0–30).
[b] Higher scores indicate more pleasure (range 0–18).
[c] Higher scores indicate more discomfort (range 0–6).
[d] Score <1 indicates less frequent than usual (range 0–3).
[e] Higher scores indicate higher levels of anxiety and depression (range 0–21).
[f] Higher score indicates more problems (range 0–24).